IN THE CLAIMS

Please amend the claims as follows:

1.   (original):   A method of estimating a frequency response of a wireless channel in a wireless communication system, comprising:

obtaining at least two groups of received pilot symbols for at least two sets of pilot subbands, one group of received pilot symbols for each set of pilot subbands, wherein each of the at least two sets of pilot subbands is used for pilot transmission in a different symbol period;

obtaining at least two initial frequency response estimates based on the at least two groups of received pilot symbols, one initial frequency response estimate for each group of received pilot symbols;

deriving an overall channel impulse response estimate based on the at least two initial frequency response estimates, wherein the overall channel impulse response estimate comprises more taps than the number of pilot subbands in each of the at least two sets of pilot subbands; and

deriving an overall frequency response estimate for the wireless channel based on the overall channel impulse response estimate.

2.   (original):   The method of claim 1, wherein the deriving an overall channel impulse response estimate based on the at least two initial frequency response estimates includes

deriving at least two initial channel impulse response estimates based on the at least two initial frequency response estimates, one initial impulse response estimate for each initial frequency response estimate, and

deriving the overall channel impulse response estimate based on the at least two initial channel impulse response estimates.

3. (original): The method of claim 1, wherein the deriving an overall channel impulse response estimate based on the at least two initial frequency response estimates includes

deriving an intermediate frequency response estimate based on the at least two initial frequency response estimates, and

deriving the overall channel impulse response estimate based on the intermediate frequency response estimate.

4. (original): The method of claim 1, wherein the overall channel impulse response estimate comprises N_T taps, where N_T is a length of the overall channel impulse response estimate and is equal to total number of pilot subbands in the at least two sets of pilot subbands.

5. (original): The method of claim 1, wherein the pilot subbands in each set are uniformly distributed across N_F total subbands and are offset from the pilot subbands in remaining ones of the at least two sets of pilot subbands, where N_F is an integer greater than one.

6. (original): The method of claim 1, wherein received pilot symbols are obtained on a first set of pilot subbands in odd-numbered symbol periods, and wherein received pilot symbols are obtained on a second set of pilot subbands in even-numbered symbol periods.

7. (original): The method of claim 1, wherein the at least two sets of pilot subbands include equal number of pilot subbands.

8. (original): The method of claim 1, wherein the at least two sets of pilot subbands include different numbers of pilot subbands.

9. (original): The method of claim 2, wherein the deriving an overall channel impulse response estimate further includes

repeating each of the at least two initial channel impulse response estimates at least once to obtain at least two instances of the initial channel impulse response estimate,

forming an extended channel impulse response estimate for each initial channel impulse response estimate based on the at least two instances of the initial channel impulse response estimate, and

deriving the overall channel impulse response estimate based on at least two extended channel impulse response estimates for the at least two initial channel impulse response estimates.

10. (original): The method of claim 9, wherein the deriving an overall channel impulse response estimate further includes

selectively adjusting phase of the at least two instances of each initial channel impulse response estimate, and wherein the extended channel impulse response estimate for each initial channel impulse response estimate is formed based on at least two selectively phase adjusted instances of the initial channel impulse response estimate.

11. (original): The method of claim 9, wherein the deriving an overall channel impulse response estimate further includes

scaling each of the at least two extended channel impulse response estimates with a respective set of coefficients to obtain a corresponding scaled channel impulse response estimate, wherein at least two scaled channel impulse response estimates are obtained for the at least two extended channel impulse response estimates with at least two sets of coefficients, and

combining the at least two scaled channel impulse response estimates to obtain the overall channel impulse response estimate.

12. (original): The method of claim 11, wherein the at least two sets of coefficients are for a finite impulse response (FIR) filter.

13. (original): The method of claim 11, wherein the at least two sets of coefficients are for an infinite impulse response (IIR) filter.

14. (original): The method of claim 11, wherein each set of coefficients include N_{cp} coefficients of a first value and N_L coefficients of a second value, wherein the N_{cp} coefficients of the first value are for first N_{cp} taps of the overall channel impulse response estimate, and wherein the N_L coefficients of the second value are for remaining taps of the overall channel impulse response estimate, where N_{cp} and N_L are integers greater than one.

15. (original): The method of claim 1, wherein each of the at least two initial channel impulse response estimates is derived by performing an inverse fast Fourier transform (IFFT) on a respective one of the at least two initial frequency response estimates.

16. (original): The method of claim 1, wherein the overall frequency response estimate is derived by performing a fast Fourier transform (FFT) on the overall channel impulse response estimate.

17. (original): The method of claim 1, further comprising:

setting selected ones of N_T taps of the overall channel impulse response estimate to zero, where N_T is a length of the overall channel impulse response estimate and is an integer greater than one.

18. (original): The method of claim 17, wherein last N_Z of the N_T taps of the overall channel impulse response estimate are set to zero, where N_Z is less than N_T.

19. (original): The method of claim 18, wherein N_Z is equal to $N_T - N_{cp}$, where N_{cp} is a cyclic prefix length for the system and is an integer greater than one.

20. (original): The method of claim 1, further comprising:

determining energy of each of N_T taps of the overall channel impulse response estimate, where N_T is a length of the overall channel impulse response estimate and is an integer greater than one; and

setting each of the N_T taps to zero if the energy of the tap is less than a threshold.

21. (original): The method of claim 20, wherein the threshold is derived based on total energy of the N_T taps.

22. (original): The method of claim 1, further comprising:

determining energy of each of N_T taps of the overall channel impulse response estimate, where N_T is a length of the overall channel impulse response estimate and is an integer greater than one;

retaining N_X taps with largest energy among the N_T taps of the overall channel impulse response estimate, where N_X is an integer one or greater; and

setting N_T - N_X remaining taps of the overall channel impulse response estimate to zero.

23. (original): The method of claim 1, further comprising:

performing detection on received data symbols with the overall frequency response estimate.

24. (original): The method of claim 1, wherein the wireless communication system utilizes orthogonal frequency division multiplexing (OFDM).

25. (original): The method of claim 1, wherein the wireless communication system utilizes discrete multi tone (DMT).

26. (original): The method of claim 24, wherein each OFDM symbol transmitted in the wireless communication system includes a cyclic prefix, and wherein the overall channel impulse response estimate comprises more taps than a length of the cyclic prefix.

27. (original): An apparatus in a wireless communication system, comprising:

a demodulator operative to obtain at least two groups of received pilot symbols for at least two sets of pilot subbands, one group of received pilot symbols for each set of pilot subbands, wherein each of the at least two sets of pilot subbands is used for pilot transmission in a different symbol period;

a pilot detector operative to obtain at least two initial frequency response estimates for a wireless channel based on the at least two groups of received pilot symbols, one initial frequency response estimate for each group of received pilot symbols;

a combiner unit operative to derive an overall channel impulse response estimate based on the at least two initial frequency response estimates, wherein the overall channel impulse response estimate comprises more taps than the number of pilot subbands in each of the at least two sets of pilot subbands; and

a first transform unit operative to derive an overall frequency response estimate for the wireless channel based on the overall channel impulse response estimate.

28. (original): The apparatus of claim 27, further comprising:

a second transform unit operative to derive at least two initial channel impulse response estimates based on the at least two initial frequency response estimates, one initial channel impulse response estimate for each initial frequency response estimate, and wherein the combiner unit is operative to derive the overall channel impulse response estimate based on the at least two initial channel impulse response estimates.

29. (original): The apparatus of claim 27, wherein the combiner unit is operative to derive an intermediate frequency response estimate based on the at least two initial frequency response estimates and to derive the overall channel impulse response estimate based on the intermediate frequency response estimate.

30. (original): The apparatus of claim 28, wherein the combiner unit is operative to

repeat each of the at least two initial channel impulse response estimates at least once to obtain at least two instances of the initial channel impulse response estimate,

form an extended channel impulse response estimate for each initial channel impulse response estimate based on the at least two instances of the initial channel impulse response estimate, and

derive the overall channel impulse response estimate based on at least two extended channel impulse response estimates for the at least two initial channel impulse response estimates.

31. (original): The apparatus of claim 30, wherein the combiner unit is further operative to

scale each of the at least two extended channel impulse response estimates with a respective set of coefficients to obtain a corresponding scaled channel impulse response estimate, wherein at least two scaled channel impulse response estimates are obtained for the at least two extended channel impulse response estimates with at least two sets of coefficients, and

combine the at least two scaled channel impulse response estimates to obtain the overall channel impulse response estimate.

32. (original): The apparatus of claim 27, further comprising:

a thresholding unit operative to set selected ones of N_T taps of the overall channel impulse response estimate to zero, where N_T is a length of the overall channel impulse response estimate and is an integer greater than one.

33. (original): The apparatus of claim 27, wherein the wireless communication system utilizes orthogonal frequency division multiplexing (OFDM), wherein each OFDM symbol transmitted in the wireless communication system includes a cyclic prefix, and wherein the overall channel impulse response estimate comprises more taps than a length of the cyclic prefix.

34. (original): An apparatus in a wireless communication system, comprising:

means for obtaining at least two groups of received pilot symbols for at least two sets of pilot subbands, one group of received pilot symbols for each set of pilot subbands, wherein each of the at least two sets of pilot subbands is used for pilot transmission in a different symbol period;

means for obtaining at least two initial frequency response estimates for a wireless channel based on the at least two groups of received pilot symbols, one initial frequency response estimate for each group of received pilot symbols;

means for deriving an overall channel impulse response estimate based on the at least two initial frequency response estimates, wherein the overall channel impulse response estimate comprises more taps than the number of pilot subbands in each of the at least two sets of pilot subbands; and

means for deriving an overall frequency response estimate for the wireless channel based on the overall channel impulse response estimate.

35.   (original):   The apparatus of claim 34, wherein the means for deriving an overall channel impulse response estimate based on the at least two initial frequency response estimates includes

means for deriving at least two initial channel impulse response estimates based on the at least two initial frequency response estimates, one initial channel impulse response estimate for each initial frequency response estimate, and

means for deriving the overall channel impulse response estimate based on the at least two initial channel impulse response estimates.

36.   (original):   The apparatus of claim 34, wherein the means for deriving an overall channel impulse response estimate based on the at least two initial frequency response estimates includes

means for deriving an intermediate frequency response estimate based on the at least two initial frequency response estimates, and

means for deriving the overall channel impulse response estimate based on the intermediate frequency response estimate.

37.   (original):   The apparatus of claim 35, further comprising:

means for repeating each of the at least two initial channel impulse response estimates at least once to obtain at least two instances of the initial channel impulse response estimate;

means for forming an extended channel impulse response estimate for each initial channel impulse response estimate based on the at least two instances of the initial channel impulse response estimate; and

means for deriving the overall channel impulse response estimate based on at least two extended channel impulse response estimates for the at least two initial channel impulse response estimates.

38.   (original):   The apparatus of claim 34, further comprising:

means for scaling each of the at least two extended channel impulse response estimates with a respective set of coefficients to obtain a corresponding scaled channel impulse response estimate, wherein at least two scaled channel impulse response estimates are obtained for the at least two extended channel impulse response estimates with at least two sets of coefficients, and

means for combining the at least two scaled channel impulse response estimates to obtain the overall channel impulse response estimate.

39.   (original):   The apparatus of claim 34, further comprising:

means for setting selected ones of N_T taps of the overall channel impulse response estimate to zero, where N_T is a length of the overall channel impulse response estimate and is an integer greater than one.

40.   (new): A computer program product, comprising:

a computer-readable medium comprising:

code for causing a computer to obtain at least two groups of received pilot symbols for at least two sets of pilot subbands, one group of received pilot symbols for each set of pilot subbands, wherein each of the at least two sets of pilot subbands is used for pilot transmission in a different symbol period;

code for causing the computer to obtain at least two initial frequency response estimates for a wireless channel based on the at least two groups of received pilot symbols, one initial frequency response estimate for each group of received pilot symbols;

code for causing the computer to derive an overall channel impulse response estimate based on the at least two initial frequency response estimates, wherein the overall channel impulse response estimate comprises more taps than the number of pilot subbands in each of the at least two sets of pilot subbands; and

code for causing the computer to derive an overall frequency response estimate for the wireless channel based on the overall channel impulse response estimate.

41. (new): The computer program product of claim 40, wherein the code for causing the computer to derive an overall channel impulse response estimate based on the at least two initial frequency response estimates includes

code for causing the computer to derive at least two initial channel impulse response estimates based on the at least two initial frequency response estimates, one initial channel impulse response estimate for each initial frequency response estimate, and

code for causing the computer to derive the overall channel impulse response estimate based on the at least two initial channel impulse response estimates.

42. (new): The computer program product of claim 40, wherein the code for causing the computer to derive an overall channel impulse response estimate based on the at least two initial frequency response estimates includes

code for causing the computer to derive an intermediate frequency response estimate based on the at least two initial frequency response estimates, and

code for causing the computer to derive the overall channel impulse response estimate based on the intermediate frequency response estimate.

43. (new): The computer program product of claim 41, wherein the computer-readable medium further comprising:

code for causing the computer to repeat each of the at least two initial channel impulse response estimates at least once to obtain at least two instances of the initial channel impulse response estimate;

code for causing the computer to form an extended channel impulse response estimate for each initial channel impulse response estimate based on the at least two instances of the initial channel impulse response estimate; and

code for causing the computer to derive the overall channel impulse response estimate based on at least two extended channel impulse response estimates for the at least two initial channel impulse response estimates.

44. (new): The computer program product of claim 40, wherein the computer-readable medium further comprising:

code for causing the computer to scale each of the at least two extended channel impulse response estimates with a respective set of coefficients to obtain a corresponding scaled channel impulse response estimate, wherein at least two scaled channel impulse response estimates are obtained for the at least two extended channel impulse response estimates with at least two sets of coefficients, and

code for causing the computer to combine the at least two scaled channel impulse response estimates to obtain the overall channel impulse response estimate.

45. (new): The computer program product of claim 40, wherein the computer-readable medium further comprising:

code for causing the computer to set selected ones of N_T taps of the overall channel impulse response estimate to zero, where N_T is a length of the overall channel impulse response estimate and is an integer greater than one.